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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,017	01/19/2006	Mark E McNie	124-1144	5227
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NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER EL SHAMMAA, MARY A	
			ART UNIT 2883	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/565,017

Applicant(s)

MCNIE ET AL.

Examiner

Mary A. El-Shammaa

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 13-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 13-16, 18, 24, and 26-303 are rejected under 35 U.S.C. 102(b) as being anticipated by Jenkins et al. (US 5,917,596).

Regarding claims 1 and 30, Jenkins discloses in at least figure 3, a variable optical attenuator device (28) comprising a first optical waveguide (320); a second optical waveguide (324); at least one moveable reflective element (350) having a variable orientation with respect to at least one of said first and second optical waveguides (320, 324), wherein the device is arranged such that an optical beam output by the first optical waveguide (320) is reflected from the at least one moveable reflective element and the orientation of the at least one moveable reflective element determines the efficiency with which the optical beam is coupled into the second optical waveguide (324), wherein in that the first and second optical waveguides (320, 324) are hollow core optical waveguides (see at least col. 6, lines 19-29); and at least one additional reflective element (348) having a fixed orientation, wherein the optical beam is reflected from both said at least one additional reflective element and said at least one moveable reflective element prior to coupling into said second optical waveguide (324) (see at least col. 6, line 19 through col. 7, line 28).

Regarding claim 2, Jenkins discloses said at least one moveable reflective element (350) has a controllable angular alignment with respect to at least one of said first and second optical waveguides (320, 324) (see at least col. 6, lines 51-67).

Regarding claim 3, Jenkins discloses variation of the angular orientation of the moveable reflective element (350) produces substantially no lateral displacement of the optical beam with respect to the second hollow core optical waveguide (324) (see at least col. 6, lines 51-67 and col. 7, lines 16-29).

Regarding claim 4, Jenkins discloses said at least one moveable reflective element has a controllable position with respect to at least one of said first and second optical waveguides (see at least col. 6, lines 51-67 and col. 7, lines 16-29).

Regarding claim 5, Jenkins discloses the first and second hollow core optical waveguides (320, 324) are formed in a common substrate (313) (see at least col. 6, lines 20-29).

Regarding claim 13, Jenkins discloses further hollow core optical waveguides (318, 322) are provided to substantially guide the optical beam from the first optical waveguide (320) to the second optical waveguide (324).

Regarding claim 14, Jenkins discloses the first optical waveguide (320) is arranged to preferentially guide radiation propagating in a fundamental mode (see at least col. 6, lines 30-38).

Regarding claim 15, Jenkins discloses the second optical waveguide (324) is dimensioned to preferentially support the propagation of radiation in a fundamental mode (see at least col. 6, lines 30-38).

Regarding claim 16, Jenkins discloses the second optical waveguide is dimensioned to support the propagation of multiple optical modes (see at least col. 6, lines 30-38).

Regarding claim 18, Jenkins discloses in at least figure 3, the first optical waveguide (320) and/or the second optical waveguide (324) are of substantially rectangular cross section (see at least col. 6, lines 30-38).

Regarding claim 24, Jenkins discloses a substrate comprising a semiconductor material (see at least col. 32, lines 20-22).

Regarding claim 26, Jenkins discloses in at least figure 3 the hollow cores of the first and second optical waveguides are formed by a base portion (313) and a lid portion (317) (see at least col. 6, lines 20-29).

Regarding claims 27-28 the Examiner notes that the claim limitation “formed by micro-fabrication techniques including deep reactive ion etching” is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation.

Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Jenkins (see MPEP 2113).

Regarding claim 29, Jenkins discloses in at least figure 3, the hollow core optical waveguides (318, 320, 322, 324) are arranged to guide light in a plane substantially parallel to the plane of the substrate (313).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-11, 17, 19-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins in view of Chang et al. (US 2003/0012509 A1).

Regarding claims 6 and 7, Jenkins is silent as to the moveable reflective element comprising a MEMS component formed in the common substrate.

However, Chang discloses in at least paragraphs [0045, 0049, and 0072] and the ABSTRACT, the moveable reflective element comprising a MEMS component formed in the common substrate. One would be motivated to use a MEMS component to alter the path of the optical signal and the change the coupling between optical channels (as discussed in Chang's ABSTRACT).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a MEMS component to alter the path of the optical signal and the change the coupling between optical channels.

Regarding claim 8, Chang discloses in at least paragraph [0072] the moveable reflective component is held in alignment in an alignment slot formed in the common substrate.

Regarding claims 9 and 10, Jenkins is silent as to moveable reflective element comprising a reflective coating and having a curved surface.

However, Chang discloses in at least paragraphs [0058, 0064, and 0066-0067] the moveable reflective element comprising a reflective coating and having a curved surface. One would be motivated to have a moveable reflective element comprising a reflective coating and having a curved surface to have a high level of reflectivity (as discussed in paragraph [0058].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a reflective coating and have a curved surface for a have a high level of reflectivity.

Regarding claim 11, both Jenkins and Chang are silent as to the moveable reflective comprising at least one deformable mirror.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a deformable mirror, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

Regarding claim 17, Jenkins is silent as to the first and/or second optical waveguide comprising a tapered section.

However, Chang discloses in at least paragraph [0054] the first and/or second optical waveguide comprising a tapered section. One would be motivated to have the first and/or second optical waveguide comprising a tapered section to have better coupling as discussed in paragraph [0054].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and/or second optical waveguide comprising a tapered section for better coupling.

Regarding claim 19, both Jenkins and Chang are silent as to the internal surfaces of the first optical waveguide and/or the second optical waveguide carrying a reflective coating.

However, Chang does teach the use of a reflective coating in at least paragraphs [0058 and 0064]. It would have been obvious to use this reflective coating on the internal surfaces of the waveguides. One would be motivated to use the reflective coating to increase reflectivity.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use reflective coating on the internal surfaces of the waveguides for increased reflectivity.

Regarding claims 20-22, Jenkins is silent as to first and second optical fiber attachment means.

However, Chang discloses in at least paragraph [0051] a first optical fiber attachment means is provided to hold in alignment an input optical fiber, the input optical fiber being arranged to couple light into the first optical waveguide, a second optical fiber attachment means arranged to receive a single mode optical waveguide is provided to hold in alignment an output optical fiber, the output optical fiber being arranged to receive light from the second optical waveguide. One would be motivated to have such an arrangement to allow grouped channels to



be interfaced directly with the input and output arrays separately, as discussed in paragraph [0051].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have first and second fiber attachment means to interface directly with the input and output arrays separately.

Regarding claim 23, both Jenkins and Chang are silent as to a beam dump.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a beam dump to absorb the beam after having it travel through the device.

Regarding claim 25, Jenkins is silent as to the substrate comprising a silicon-on-insulator (SOI) wafer.

However Chang discloses in at least paragraph [0045] the substrate being an SOI wafer. One would be motivated to use an SOI wafer because SOI wafers are readily available.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an SOI wafer.

### ***Response to Arguments***

Applicant's arguments filed 11/15/2007 have been fully considered but they are not persuasive.

As stated in the MPEP § 2111.02 (please see also *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 - CCPA 1951), if the preamble of the claim neither recites the limitations of the claim nor is necessary to give life, meaning, and vitality to the claim; then the preamble of the claim is not served to further define the structure of the claim. Thus, in regards to Claim 1, the preamble of the claim is not given any patentable weight since the preamble of the claim neither recites the limitations of the claim nor is necessary to give life, meaning, and vitality to the claim.

The functional limitation "determines the efficiency with which the optical beam is coupled" has been evaluated and considered for what it fairly conveys to a person of ordinary skill in the pertinent art in the context which it is used. See MPEP 2173.05(g). Adjusting and aiming the moveable reflective element determines the efficiency in which the beam is coupled. If the moveable reflective element is not adjusted, then the beam will not be coupled efficiently, hence the element being moveable resulting in efficient coupling.

Applicant is reminded that Attorney argument is not evidence unless it is an admission, in which case, an examiner may use the admission in making a rejection. See MPEP § 2129 and § 2144.03 for a discussion of admissions as prior art. Furthermore, the Examiner notes that rationale different from Applicant's is permissible to support a rejection. See MPEP 2144.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary A. El-Shammaa whose telephone number is 571.272.2469. The examiner can normally be reached on M-F (8:30am-5:00pm).


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571.272.2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*MAE*  
January 2, 2008



**Frank G. Font**  
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